

## C L A I M S

1. A system for the preparation and handling of multiple solid state samples, in particular for spectroscopic and microscopic analysis, said system comprising:
  - a sample holder assembly for multiple solid-state samples, said sample holder assembly comprising:
    - a sample holding body having first and second sides, provided with multiple sample receiving open-ended bores extending through said body between said first and second sides, each bore having a first opening at the first side and a second opening at the second side,
    - a closure body adapted to be mounted against the second side of the sample holding body, said closure body having a closure side adapted to rest against the second side of the sample holding body for closing off the second openings of the bores in said sample holding body,
    - compacting means for compacting samples filled in bores of the sample holding body as these bores are closed off on the second side by the closure body.
2. System according to claim 1, wherein the compacting means comprise compaction plugs each adapted to be introduced into a bore via the first opening for compacting a sample in said bore.
3. System according to claim 1, wherein the sample holding assembly comprises support plugs each adapted to be introduced into a bore via the first opening and to be secured with respect to said bore for supporting a sample in said bore.
4. System according to claim 1, wherein the system comprises compacting and support plugs each adapted to be introduced into a bore via the first opening for compacting the sample and to be secured with respect to said bore for supporting the compacted sample in said bore.

5. System according to claim 2 or 4, wherein the plugs are slideable in the bores and the compacting means are adapted for pushing the plugs into the bores thereby compacting the samples.
10. 6. System according to one or more of the preceding claims 2-5, wherein the plugs are diametrically expandable under axial compression such that the plugs are expanded and thus fixed in said bores.
15. 7. System according to one or more of the preceding claims 2-4, wherein the plug and bore are screwthreaded.
20. 8. System according to one or more of the preceding claims 2-4, wherein the system further comprises securing means for securing a plug in a bore, e.g. an adhesive.
25. 9. System according to claim 2, wherein the system compacting means comprise a support removably fixed over the first side of the sample holding body, said support having screwthreaded holes aligned with the bores and provided with screws for pushing the plugs into the bores.
30. 10. System according to one or more of the preceding claims, wherein the second side of the sample holder has a planar surface and wherein the corresponding face of the closure body also has a planar surface.  
11. System according to claim 8, wherein the planar surface of the closure body is a mirror-quality surface.
35. 12. System according to claim 10, wherein the planar surface of the closure body is polished.
13. System according to one or more of claims 10-12, wherein the planar surface of the closure body is one of the following

materials: glass, ceramic, aluminumoxide, silicon, siliconcarbide, titaniumnitride.

14. System according to one or more of the preceding claims,  
5 wherein the bores have a diameter less than 2 cm, preferably  
less than 1 cm, most preferably less than 0.5 cm.

15. System according to one or more of the preceding claims,  
wherein the hardness of the closure side of the closure body is  
10 greater than 6 Mohs, preferably 7 Mohs, most preferably 8 Mohs.

16. A sample holding assembly according to one or more of the  
preceding claims.

15 17. A method for preparing multiple samples, in particular for  
spectroscopic and microscopic analysis, wherein use is made of  
a system according to one or more of the preceding claims, and  
wherein each sample is filled into a bore via the first opening  
thereof, said bore being closed at the second side by the  
20 closure body, and wherein the samples are compacted using said  
compacting means.

18. A method according to claim 17, wherein the thickness of  
the compacted samples is at least 100 micrometers, preferably  
25 at least 200 micrometers, most preferably at least 500  
micrometers.

19. A method according to claim 17 or 18, wherein the  
thickness of the sample is measured.  
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20. A method for spectroscopic or microscopic analysis of  
multiple samples, wherein said samples are prepared in a sample  
holder using the method according to claims 17-19, and wherein  
the closure body is removed from the second side of the sample  
35 holding body thereby exposing the corresponding surface of the  
samples, and then subjecting the samples to spectroscopic or  
microscopic analysis.

21. A method according to claim 20, wherein the samples are subjected to a physical or chemical treatment prior to or during the samples to spectroscopic or microscopic analysis.

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22. A method according to claim 20 or 21, wherein the bores are open between the first opening and the sample so that also the surface of the samples directed towards the first side of the sample holder body are exposed, and subjecting the samples 10 to a transmissive spectroscopic analysis.

23. Use of a sample holder assembly according to one or more of the preceding claims in a spectroscopic or microscopic analyser.